

November Mixed Waste Subgroups Highlights

The Hanford STCG Mixed Waste (MW) Subgroup met on November 10, 1999 in the EESB Stampede Room at 1:00 pm.

John Smalling, director of ERWM Sales for Canberra, gave a viewgraph presentation on Canberra's characterization technologies for deactivation work. Carlton Green, the local sales representative, was also present from Canberra. Canberra has support services available in more than 60 countries and a staff of over 1000 people. They operate mobile labs as a service as well as installing monitoring/metering systems in the United States. Canberra's systems are ISO 9001 certified. Some of the tools Canberra has available include: the Q² low level waste counting system; the gamma box counting system; the automated conveyor system for soil and rubble; and the ISOCS (In Situ Object Counting System). John then discussed each of these in detail.

There are about 50 Q² systems in use at DOE Sites to separate non-radioactive, low level and TRU Waste. The Q² system can be used to certify wastes as well as quantify the amount of TRU and beta/gamma waste. Canberra has gamma assay and neutron assay systems in a variety of automated modes to measure the contents of drums and boxes. The automatic box counter is adjustable to allow boxes of various sizes to be scanned quickly. Canberra has built over 60 mobile labs for sampling and analysis as well as a mobile soil measurement and locating system. The D&D Focus Area and Florida International University worked with Canberra to develop an internal/external pipe assessment system. This can be used to scan pipes, I-beams and other long objects to measure the amount of radioactivity on the outside and inside of the long object.

John reviewed the approaches and solutions that Canberra has employed for environmental remediation and building decommissioning projects. The general formula for success employed by Canberra is to use in situ high resolution Ge gamma spectroscopy first to figure out what to do and then count the waste generated in large volumes before sorting to minimize the volume. Canberra uses in situ Ge spectroscopy for all of the above tasks as well as at the end of the project to release the site as clean. In situ has many advantages including speed and cost over conventional sampling and lab analysis. In some cases it may be difficult and dangerous to get a sample and the sample may not be representative of the entire area/object being studied. The idea is to take the lab to the sample rather than vice versa. John then reviewed the ultimate in situ systems specifications which includes the ability to assay any size or type of object, at any distance and with accurate results.

Canberra has developed the In Situ Object Counting System (ISOCS) that is faster, better and cheaper than sampling and lab testing. John then reviewed a number of examples of how ISOCS has been used, including : tank content

measurements without opening the tank; wall contamination with hot spot measurements; measuring the activity on the surface of a spent fuel pool liner; accurately measuring the activity in drums of ion exchange resins prior to disposal; quickly determining the amount and depth of radioactive contamination in a concrete wall; measuring the amount of contamination in reactor wastewater sediment in situ by waterproofing the detectors; and quantitatively assaying an entire heat exchanger without opening and cutting it into pieces for analysis. John then discussed the use of Ge collimated detectors to accurately measure floor contamination; the activity level inside pipes; wall and ceiling contamination; and drum and shipping container content analysis. Canberra also has developed a method of measuring sub-surface contamination in situ which is much less costly and quicker than the conventional sampling techniques. The ISOCS is also versatile and adaptable enough to be used to measure samples also.

Canberra has developed a new Broad Energy Germanium (BEGe) detector that is more efficient and has higher resolution at all energy levels. The BEGe detector was developed to measure Alpha suspect waste and for environmental sampling. Combined with ISOCS, the BEGe detector can be used to more accurately detect U, Pu, Am and Th in the field. In addition to its traditional equipment for sale, Canberra also rents out equipment and services for smaller jobs at multiple job sites. John ended his presentation by stressing that characterization and LLW minimization should be considered early in a project in order to save time and money later. Canberra personnel are available to discuss any measurement problems and techniques to overcome them.

Larbi Bounini reviewed the results of a demonstration of tectonite, a new cement binder, that may be used to stabilize salt wastes at the Effluent Treatment Facility in 200E. A letter report summarizing the demo and results has been sent to all subgroup members. The waste to be stabilized will be brine effluent from the proposed vitrification of tank wastes. The MWFA has been examining some systems for salt stabilization and provided \$30K of funding for this demo. The MWFA also sent two waste simulants to test with tectonite and Hanford sent a simulant of the expected ETF waste. Tectonite is manufactured by Tectonics International of Warm Springs, OR and is a magnesium oxy-phosphate cement binder. It microencapsulates the waste contaminants in a solid matrix with the aid of the binder. One of the MWFA waste stimulants was a high Cl solid salt while the other was a high nitrate solid salt.

The three waste simulants were combined with tectonite and then two tests were conducted: a comprehensive strength test and the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP was used to detect Cd, Pb, Hg, Ba, and Cr VI. All of the simulant samples encapsulated in tectonite passed the comprehensive strength test except the high Cl simulant at the 500 psi level. Longer curing times would raise the strength of the tectonite. Of the chemicals in the TCLP, only Cr was a problem for some of the simulants tested. The simulants were spiked with considerably more Cr than will be addressed at

ETF. If Cr does need to be addressed, the report recommended that reagents could be added to improve the results.

In summary, the tectonite passed the comprehensive strength test and the TCLP for all chemicals except for Cr IV which may require the addition of a reducing agent. Tectonite sets up very quickly compared to Portland cement. There is a need to coordinate the BNFL design work with the ETF so that the liquid wastes from the vit plant can be handled correctly. The MWFA will be given a copy of this letter report to spread the word about tectonite. One other use for this could be in sludge solidification. Rocky Flats may need to use tectonite now.

Work on the Boxed Waste Assay System (BWAS) certification project is stopped due to the lack of matching funding from Hanford. The MWFA will pull the money back that they provided if no other uses for it at Hanford can be agreed upon. DOE-RL and the MWFA are in discussions on other projects that can use the funding. Hanford needs the BWAS certified in about two years. The focus at WRAP is now on drums rather than boxes.

Personnel from the MWFA visited Hanford recently and met with program engineers to discuss the use of robotics for remote size reduction including cutting up long-length equipment from the tank farms. The MWFA is sending us \$100K to begin work on a solution to this problem. Sharon Bailey, who works with the Robotics Cross-Cutting Focus Area, will meet with Larbi Bounini to begin scoping this effort. The Robotics Cross-cutting Focus Area will also contribute to this effort. In the future, FETC may contribute \$1.5 million on solutions to the problem.

Bill Bonner discussed a proposal that PNNL will be sending to the MWFA on November 19. The proposal is for a hydrogen getter to remove hydrogen in drums that are shipped in TRUPACT containers. The proposed PNNL system meets 8 of the 10 criteria that the MWFA has identified and the researchers are working on meeting the other two criteria. Subgroup members will be sent a copy of the PNNL proposal via e-mail when it is sent to the MWFA.

A draft copy of the 1999 MW Subgroup annual report has been sent to all subgroup members for their review. Please send any comments to Steve Weakley or bring them to the next subgroup meeting. This report will be finalized and given to the STCG Management Council in January.

The next MW subgroup meeting is scheduled for December 9 at 1 p.m. in the EESB Stampede Room.

Mixed Waste Subgroup Meeting Attendees – 11/10/99

Gary Ballew	PacRim	946-0611
Bill Bonner	PNNL	372-6263
Larbi Bounini	WMH	376-4650
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Ken Quigley	WMH	376-7779
Greg Sinton	DOE-RL	373-7939
Jim Sloughter	FDH-TM	375-2413
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Gary Troyer	FDH	373-1572
Steve Weakley	PNNL	372-4275
Rick Wible	DOE-RL	372-4776